



MARSHALL STAR

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March 8, 2007

New Horizons gets a boost from Jupiter flyby

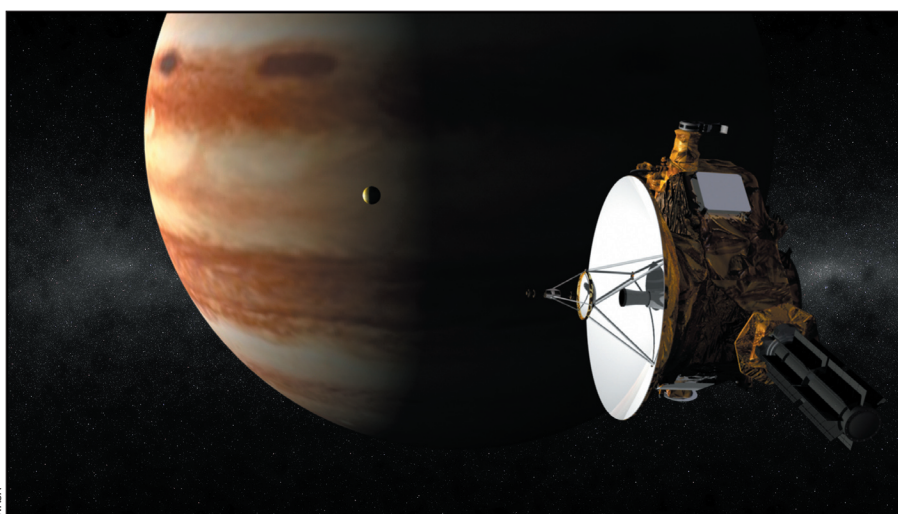
By Sherrie Super and Dr. Tony Phillips

On Feb. 28, New Horizons, NASA's Pluto-bound spacecraft, made its closest pass to Jupiter. Along the way, the spacecraft is picking up a few souvenirs — photos, data and an extra 9,000 mph, courtesy of the largest planet in our solar system.

New Horizons is the first in NASA's New Frontiers program of medium-class planetary missions. NASA's Discovery and New Frontiers Program Office at the Marshall Center assists the Science Mission Directorate at NASA Headquarters with program management, technology planning, systems assessment, flight assurance and public outreach. New Horizons was already the fastest spacecraft ever to leave Earth, but it needs even more speed to catch Pluto, which is receding from the sun. Winter is coming to Pluto, and researchers want New Horizons to arrive before Pluto's thin atmosphere freezes and falls to the ground.

So New Horizons is stealing a little energy from Jupiter.

"It's called a gravity assist maneuver," says Dr. Robert Farquhar, formerly the New Horizons mission director at the Johns Hopkins University Applied Physics Laboratory. "New Horizons will dip into the gravity well of Jupiter and 'slingshot out' with more velocity



In this artist's rendering, New Horizons soars past Jupiter as the volcanic moon Io passes between the spacecraft and the planet.

than it had when it went in."

For New Horizons to speed up, of course, Jupiter must slow down. "That's conservation of energy," he says. But no one will notice. The change in Jupiter's orbit around the Sun due to the flyby is fantastically small, like "taking a single drop out of the ocean," says Farquhar.

This insignificant loss for Jupiter amounts to a big boost for New Horizons. The piano-sized spacecraft will gain enough energy to

See Jupiter on page 7

Orbital Express to launch March 8

The Orbital Express satellite servicing demonstrator is slated to launch Thursday night, March 8, from Cape Canaveral Air Force Station in Florida. The two-hour launch window opens at 8:37 p.m. CST.

A joint program of the Defense Advanced Research Projects Agency, the Boeing Company of Huntington Beach, Calif., and NASA, Orbital Express will test automated rendezvous and

docking capabilities that could, in the coming decade, become a viable alternative to some human-piloted missions.

The three-month Orbital Express mission involves deployment of two test satellites. The Advanced Video Guidance Sensor, an innovative laser imaging system developed at Marshall, will enable the two satellites to dock and interact without human intervention.

The real reasons the nation explores

Those of us who work in and around the space program have a good idea about the benefits that cascade as a result of exploration and technology. We don't have to be convinced of the importance of building launch vehicles to replace the shuttle, or the excitement in store once we become residents of the moon. I've given numerous speeches and held many discussions on the topic of our journey to the moon and then venturing beyond. I talk about how the space program helps America's economic growth and how advances in space



David King

technology hold great promise in making our lives better. But does logic, supported by great examples, make a compelling argument? Well, perhaps not. Maybe our argument should be inspired by the human spirit — those things that move us.

Last January, Administrator Mike Griffin spoke at the Quasar award dinner in Houston. During his speech, he touched on the logic that we associate with exploration. He framed it as the "acceptable reasons" for space exploration. He talked about those things we, in the aerospace business, can truly grasp, such as scientific discovery, spin-offs and national security interests. However, he emphasized that these are not the "real reasons" a nation explores.

The real reasons a nation explores are embedded in the intangible, such as national pride or being the world's leader in space exploration. The ultimate point of the journey is not landing on the moon, but living on it. Being the best at something, which we know about when Auburn and Alabama play each other in football, is part of who we are as competitive beings. Applied to space exploration, maybe being known as the country that led the way and continues to lead the way is one of the real reasons to go do this.

It might be hard to shift our thinking from tangible to intangible reasons. After all, many of us are engineers and scientists, and we like things to be linear and logical. Perhaps discovering the real reasons for our upcoming journey requires more latitude in our analysis, appealing to emotion rather than traditional argument. After giving it great thought, I believe Mike's on to something. Extending a human presence across the solar system is about doing the ultimate — extending our country across the solar system. And, with each milestone we reach, those tangible things — the great technologies of the future — will make their way into our homes and hospitals just as they have since "one giant leap" was taken decades ago.

Take a moment to read Mike's speech at www.nasa.gov. I think you'll find it very compelling. Also, I'm curious to know what you think about the tangible versus intangible reasons. Send me a note at MSFC-INTERCOM@msfc.nasa.gov. I might just adopt your thinking for my next speech.

David A. King
Director, Marshall Space Flight Center

Teams assessing hail damage to Atlantis' external tank

By Sandra Martel

Space Shuttle Atlantis is off the launch pad and back inside the Vehicle Assembly Building at the Kennedy Space Center, Fla., after a severe thunderstorm with hail on Feb. 26 damaged the shuttle's external fuel tank and spoiled plans for a March 15 liftoff.

Teams will evaluate the tank inside the assembly building, where it can be more easily accessed, to get an accurate accounting of foam damage. Once an up-close look at the damage is complete, the type of repair required and the time needed for that work can be determined and a new target launch date will be set.

Mission STS-117 to the International Space Station will be scheduled sometime after a Russian Soyuz spacecraft returns from the station. The Soyuz is delivering new station crew members and returning others to Earth in late April. Adequate time is needed between the Soyuz undocking and the shuttle's arrival to the station.

During the 11-day STS-117 mission, the six-member crew will install a new truss segment, retract a set of solar arrays and unfold a new set on the starboard side of the station. Lessons learned from two previous missions will provide the astronauts with new techniques and tools to perform their duties.

STS-117 Commander Rick Sturckow, pilot Lee Archambault and mission specialists Jim Reilly, Patrick Forrester, Steven Swanson and John "Danny" Olivas will continue training at NASA's Johnson Space Center in Houston, as they await a new target launch date.

The writer, an ASRI employee, supports the Office of Strategic Analysis and Communications.

Discovery's STS-116 astronauts visit Marshall on March 6

By Sanda Martel

Astronauts from Space Shuttle Discovery's STS-116 mission visited the Marshall Center on Tuesday, March 6, to present highlights of their December 2006 flight to the International Space Station and to thank Marshall employees for their role in making it a success.

Discovery's liftoff on Dec. 9 from the Kennedy Space Center, Fla., was the first nighttime launch in more than four years. Landing was Dec. 22 at the Kennedy Center.

STS-116 Commander Mark Polansky and mission specialists Nicholas Patrick, Bob Curbeam and Christer Fuglesang presented video highlights of their 13-day mission to reconfigure the space station's power and cooling systems from a temporary setup to a permanent mode and to add a new piece to the station's backbone. Fuglesang is a European Space Agency astronaut. The mission featured four spacewalks.

Marshall Center Director David King welcomed the astronauts in Building 4200's Morris Auditorium. King praised the "spectacular crew" for their complex work during the mission and said their work represents a "great milestone for the agency."

STS-116 was the second in a series of missions that are among the most complex in space history. The addition to the structure of the station will enable future missions to attach a new set of solar arrays.

A fourth spacewalk was added to the mission on flight day five to retract a solar array that only partially folded into its box. The solar wings were retracted far enough so that the new arrays installed in September 2006 could begin

to fully rotate and track the sun to provide power. Mission managers decided, however, to address the problem of the partially retracted arrays while the shuttle crew was on the station. With only a few days notice, mission engineers in both the shuttle and station programs developed a spacewalk plan for Curbeam and Fuglesang that resulted in the arrays' successful retraction on flight day 10.

Robert Lightfoot, manager of the Space Shuttle Propulsion Office at Marshall, said Tuesday that the mission, "was an exciting one, and the crew and ground teams did an outstanding job working through the solar array retract issues and reconfiguring the space station's power system."

"The Marshall-managed elements performed extremely well during the shuttle's ascent, making it a great ending to a successful 2006," he added.

The writer, an ASRI employee, supports the Office of Strategic Analysis and Communications.



Doug Stoffer/MSFC

STS-116 mission specialist Nicholas Patrick, left, responds to a question from the audience following the astronauts' mission highlights briefing to Marshall Center employees March 6. Looking on are mission specialists Christer Fuglesang and Bob Curbeam, and Commander Mark Polansky.

Obituaries

Marion S. Hardee, 83, of Huntsville died Nov. 30. He retired from the Marshall Center in 1979 as a procurement officer. He is survived by his wife, Elsie Hardee.

Darrell W. Moore, 74, of Huntsville died Feb. 25. He retired from the Marshall Center in 1988 as an engineer.

The face of mission success is:

Ed Adams, aerospace engineer in the Systems Management Branch and Spacecraft & Vehicle Systems Department in the Marshall Center's Engineering Directorate

Ed Adams considers himself very blessed. While growing up in Mexico, he read all about NASA and Dr. Wernher von Braun, the first director of the Marshall Center. "It was just wonderful and very interesting," Adams said. "I wanted to be a part of that." His desire came true, and the aerospace engineer began his career at NASA in 1979. "I consider myself to be living the American dream," he said.

What is your education background?

I attended the Instituto Tecnológico de Merida in Yucatan, Mexico, where I majored in science and engineering. They did not have aerospace engineering, but I took a lot of physics, chemistry and math. Upon returning to the United States, I continued my education at Auburn University in Auburn, Ala. I graduated in 1972 with a degree in science, math and Spanish, with a focus on physics engineering.

I also took postgraduate courses at the University of Alabama at Birmingham so I could teach gifted and talented classes. In addition, I attended the University of Alabama in Huntsville to earn a teaching certificate in math, science and Spanish.

I have taken various engineering and management courses at Marshall that were offered by other universities.

How long have you been at the Marshall Center?

I have been at Marshall for 27 years.

What are the key responsibilities of your job?

I am responsible for the Configuration and Data Management internal audits for the Systems Management Branch. Internal audits are to ascertain that we are complying with our Requirements and Organization Work Instructions during design and production of the programs and projects that we are involved with, such as the space shuttle and Ares I

spacecraft. In addition, I coordinate and monitor all Spacecraft & Vehicle Systems Department external audits. I also coordinate and monitor all of the department's contract Task Orders with Jacobs Technology, a Marshall contractor. I make sure that the requested Task Orders are processed, funded and approved on time.

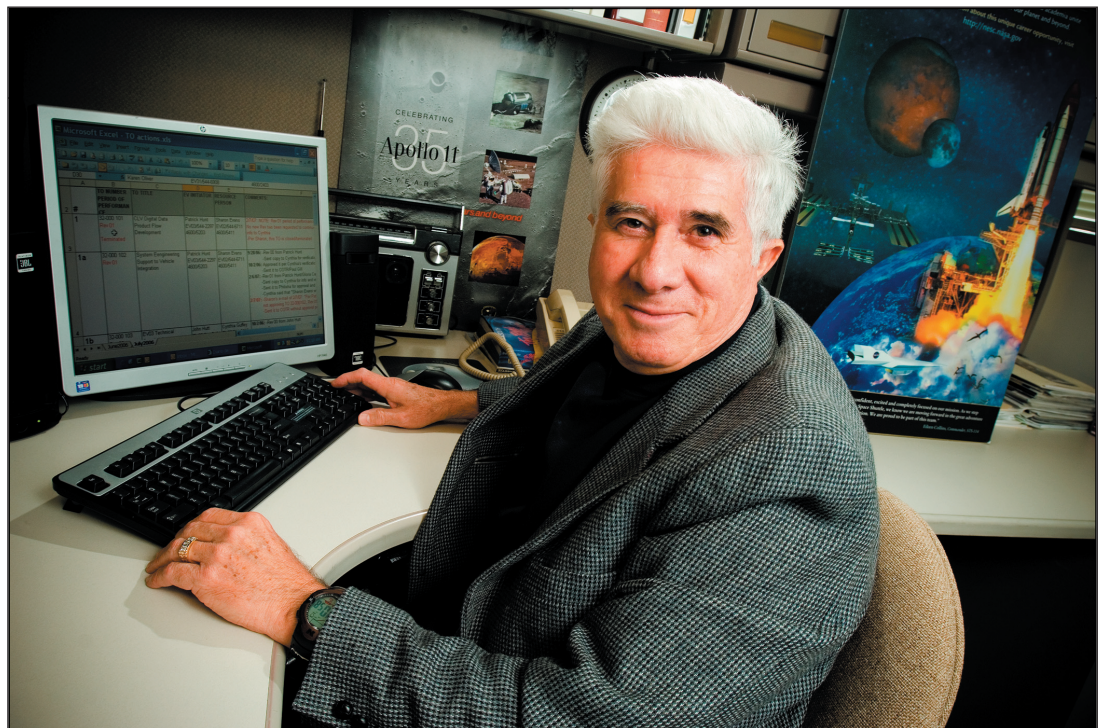
What services does your job provide in support of the center's mission?

The Systems Management Branch is very much involved in projects such as the space shuttle and the development of the Ares I vehicle. In monitoring and supervising the fabrication of the Ares I spacecraft, we are playing a huge role in supporting the center's mission. Every day, we get closer to going back to the moon. And every day, we get closer to going to Mars and beyond. It's amazing to be involved with the space program in such a critical period.

What do you hope to accomplish in your role this year?

It has been very important for me to continue my success in all of my tasks to ensure my job performance is top-notch. It's also very important for me to successfully follow the requests and directions

See Adams on page 5



David Higginbotham/MSFC

Ed Adams, aerospace engineer in the Spacecraft & Vehicle Systems Department.

James Webb telescope mirrors reach first milestone

The James Webb Space Telescope — slated to launch to space in 2013 to study the origins of the cosmos — has reached a critical early milestone.

NASA partner AXSYS Technologies of Cullman, Ala., tasked with shaping and reducing the weight of the telescope's 18 beryllium mirror "blanks," recently completed and delivered the last of the mirrors, including spares. The blanks now have gone to SSG-Tinsley of Richmond, Calif., for grinding and polishing.

The Marshall Center expects to receive the mirrors in early 2008, to conduct space environment testing in the X-ray Calibration Facility. Marshall's Science and Mission Systems Office and the Engineering Directorate support a variety of component testing activities for James Webb telescope hardware and optics.

AXSYS, a subcontractor to Ball Aerospace of Boulder, Colo., used a proprietary "honeycombing" drilling technique to trim each blank from 475 pounds to just 46 pounds, a process that took roughly a year per mirror segment. Once assembled and deployed in space, the 18 segments will form a single, powerful mirror nearly 30 square yards in size — seven times larger than the Hubble Telescope mirror, but roughly half its weight.

The James Webb Space Telescope will provide new insight into the origins of the universe, looking back more than 10 billion years at the period when the first matter likely converged to form stars and galaxies.

The program is managed by NASA's Goddard Space Flight Center in Greenbelt, Md. Northrop Grumman Space Technologies of Redondo Beach, Calif., is the prime contractor.

For more information, visit <http://www.jwst.nasa.gov>.



Chad Sanders, a machinist for AXSYS Technologies in Cullman, monitors cutting operations on a James Webb Space Telescope mirror segment.

Adams

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of my supervisors in all my job assignments. Also, my respect, honesty and loyalty to my supervisors, co-workers and NASA as a whole have always been genuine and I consider myself a team player. Therefore, I will continue to strive for the same in the coming year.

What is the biggest challenge you face?

For me, everything is a challenge because I want to do the job right. I always want to learn something new when I perform a particular job. I'm always ready to tackle any job that's given to me, and I am often assigned many different tasks and projects. If I am not familiar with the tasks, I do research, ask questions or seek guidance from my supervisor and co-workers. I always strive to fulfill the goals of the project.

On the personal side, how do you like to spend your leisure time?

I am happily married to my wife, Wanda, and when I get home, we talk about family matters and current events. I love to listen to classical music and to read on any subject. I also love to watch television — the news, NASA TV, the History Channel and the National Geographic Channel.

I am also a political buff. Although I was born in Yucatan, Mexico, I am very proud to be an American and am very interested about what is going on in the country, especially the security of the United States.

Jessica Wallace, an ASRI employee and Marshall Star editor in the Office of Strategic Analysis and Communications, contributed to this article.

2007 Software of the Year Award open to Marshall employees

The call for submissions for the 14th Annual NASA Software of the Year Award is underway. The award is designed to recognize developers of exceptional software created for or by and owned by NASA.

The award includes the NASA Software Medal, a certificate signed by Administrator Michael Griffin and as much as \$100,000. Winners may also be eligible for publication in the "Innovation in Systems and Software Engineering" NASA journal. For more information, go to "Inside Marshall." For questions, contact James McGroary at 544-0013 or Lisa Hughes at 544-0018. The deadline is April 13.

Bryan Barley has eye on space exploration, ear for music

By Sherrie Super

Bryan Barley of the Marshall Center has made a career of marching to the beat of a different drum. That's no surprise, given that this NASA systems engineer began his college career as a music major and remains active in music education 20 years later.

Barley is the program integration manager for Discovery and New Frontiers, two programs that explore the planets and our solar system. The missions under these program umbrellas ask — and seek the answers to — some pretty challenging questions. How did our solar system form and evolve? What other Earth-like planets exist outside our solar system? What can we learn about the moon, asteroids, comets and our neighboring worlds from Mercury to Pluto?

Barley's role in answering these questions is simple, yet far reaching. "I have the fun part," he says. "I look across all the missions, identify common issues and seek program-level solutions." With eight separate, active missions in these programs spread across an array of NASA centers and research institutions, this is no small task. It involves analyzing costs, schedules and resources — with an eye on ensuring that lessons learned from prior and current missions are incorporated into plans for future missions.

With responsibilities for oversight of project planning, development, launch, mission operations and ongoing assessments, Marshall's Discovery and New Frontiers Program Office manages the programs for NASA Headquarters' Science Mission Directorate in Washington.

Integrating the wide array of mission activities keeps Barley focused on the bigger picture, while pursuing the many detailed tasks that come with his job. Analyzing schedules, assessing costs, performing special studies, negotiating contracts and drafting reports are just some of the responsibilities he tackles on any given day.

So how did Barley, a former music major, end up with his finger on the pulse of space exploration? It began with a full scholarship to study music at Alabama A&M University in Huntsville. While pursuing the music degree, he discovered an avid interest in engineering. He changed his major to electrical engineering while continuing to study music.

His college credits include coursework from both Alabama A&M University and the University of Alabama in Huntsville, where



Doug Stoffer/MSFC

Bryan Barley, program integration manager for Discovery and New Frontiers Programs.

he graduated in 1989 with a bachelor's degree in electrical and computer engineering.

In 1991, he joined Marshall as a systems engineer, developing training simulators and software to support payload training for Spacelab missions. From there, Barley transitioned to crew training — helping space shuttle and Spacelab astronauts prepare for science activities of the Atmospheric Laboratory for Applications and Science-3, also known as ATLAS-3, a 1994 mission to study the Earth's atmosphere composition and solar effects.

Barley went on to become lead systems engineer for the team that developed and built the Window Observational Research Facility — a viewing portal destined for the U.S. laboratory module on the International Space Station.

Along the way, Barley married the former Kim Brown of Huntsville, had four children, and is nearing the completion of a master's degree, this one in engineering management and systems engineering from the University of Alabama in Huntsville.

Through all this, his enthusiasm for music has never waned. Today, he arranges percussion music for the marching band at Grissom High School in Huntsville and performs gospel, traditional jazz and just about any other type of music when the opportunity arises. So how does arranging and performing music compare to his role at NASA? "When it comes to music and space missions, they both have a theme and a mission," he says. "You have to know where you want to go, know what you want to do when you get there, and create a path that gets you to your final goal."

The writer, an ASRI employee, supports the support the Office of Strategic Analysis and Communications.

Jupiter

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exceed 52,000 mph — fast enough to reach New York from Tokyo in less than eight minutes. New Horizons will reach the Pluto system in July 2015 — five years earlier than without the Jupiter boost.

New Horizons will make the most of its flyby time. Through June, it will make more than 700 observations. This includes scans of Jupiter's turbulent atmosphere, a detailed survey of its ring system and a detailed study of its largest moons. The spacecraft also will take the first-ever trip down the long "tail" of Jupiter's magnetosphere, a wide stream of charged particles that extends tens of millions of miles beyond the planet, and the first close-up look at Red Spot Jr., a nascent storm south of Jupiter's famous Great Red Spot.

Later, after an eight-year cruise from Jupiter, New Horizons will conduct a five-month-long study of Pluto and its moons.

The Applied Physics Laboratory in Laurel, Md., manages the mission for NASA's Science Mission Directorate. The mission team also includes NASA's Goddard Space Flight Center in Greenbelt, Md.; NASA's Jet Propulsion Laboratory in Pasadena, Calif.; the U.S. Department of Energy in Washington; Southwest Research Institute; and several corporations and university partners.

Sherrie Super, an ASRI employee, supports the Office of Strategic Analysis and Communications. Dr. Tony Phillips is the production editor for www.science.nasa.gov.

A brief history of planetary flybys

By Sherrie Super

Jupiter is not the only helping hand in the solar system. Earth's gravity has donated its share of energy to ten different space vehicles, beginning in 1990. The first was Giotto, a European Space Agency mission to study Halley's Comet. Giotto launched in 1985, passed Halley's Comet in 1986, and in 1990 returned to Earth's orbit, where it picked up a gravity-assist boost and a redirection toward another comet, Grigg-Skjellerup, in 1992.

The most recent spacecraft to fly by Earth was MESSENGER, NASA's Mercury-bound spacecraft. Short for "Mercury Surface, Space ENvironment, GEochemistry and Ranging," MESSENGER launched on Aug. 3, 2004, and swung past Earth almost one year later in 2005. Along the way, it picked up an added boost, a redirection, and hundreds of stunning images of Earth.

The writer, an ASRI employee, supports the Office of Strategic Analysis and Communications.

Classified Ads

To submit a classified ad to the Marshall Star, go to Inside Marshall, to "Employee Resources," and click on "Employee Ads — Submit Ad." Ads are limited to 15 words, including contact numbers. No sales pitches. Deadline for the next issue is 4:30 p.m. Thursday.

Miscellaneous

Harry Connick Jr. concert tickets, March 8, VBCC, 6th row, center stage, 2 tickets for \$160. 256-679-5359
Table saw, 10"; jointer, 6"; \$100 each; Exercise workout bench w/attachments and weights, \$100. 883-8664
Chest freezer, 6', old but good, you haul, \$20; gas grill, \$40. 837-6776
Golden Retriever puppies, 8 wks., no papers provided, parents on premise, \$125. 773-0660
Turbo Tax Basic for 2006 federal returns, Quicken Basic 2005 Personal Finance, boxes, \$15 both. 683-7683
Stone Brand mortar mixer, 8HP Honda engine, 2-3 bag capacity, \$300. 837-2426
Brindle Boxer puppies, male, two females, first shots, wormed. 256-883-6065
Two Old Towne Otter kayaks, blue, red, \$200 each or both \$350. 931-433-9243
John Deere posthole digger, 3-point hitch, 9" auger, \$425. 256-772-9768
Canvas painting Creation from Kirkland's, 60"x44". 655-1155
1950 MARX Royal artillery truck w/canvas top and all-tin litho "firing" cannon, \$125. 303-3702

D-Link 7DBI Omni-Directional indoor antenna 802.11B/G, ANT24-0700, new, \$20. 881-4148
Go-cart, 5HP, single seater, \$300. 656-4211
2001 John Deere riding lawn mower, LT155, 42" cut, mulcher and cover, \$1,800. 520-5764
Microsoft Visual C#.net, Version 2003, \$65. 859-9430
New bug guard, fits 01-06 Tahoe, \$25; mechanics creeper, \$7; fluorescent lights, \$1 each. 683-9364
Roland TD3 electronic drum kit, rack, 5 pads, 2 cymbals, throne, pedal, module, \$400. 345-0852
New Ipod Nano, pink, 4GB, \$150. 1-931-308-1238
Golf clubs, men's left-handed, woods 1/3/5, irons 3-9, PW, SW, putter, no bag, \$100. 882-3983
Strapless white wedding gown from David's Bridal, size 4, \$250. 256-783-4293
Two adjacent 5th row Broadway Theatre League tickets for Wonderful Town, March 30, 8 p.m., \$108. 325-0085
Australian Shepard puppies, ASCA registered, ready March 22, males and females, \$300. 256-684-6401
Piano, free delivery, \$250. 682-0888.
Makita 6213D 3/8 12Volts drill, \$40, 883-1003.
Air Gun nails, Paslode Round Drive, 3x131, 2000 nails, \$25, 883-1003.
Lily Flagg pool membership, 256-468-8177.
AKC Lab puppies, all colors, parents DNA certified, \$200. 256-729-1871

Vehicles

1991 Mazda 626, gold, 4 door, auto, air, \$600. 604-8434
2004 Kawasaki VNI500 Vulcan Classic, 7.6K miles, windshield, saddle bags, helmets, gloves, \$6,500. 520-1117
2006 Accord EX, white/tan, moonroof, loaded, cloth interior, 6 disc CD, 5K miles, \$21,500. 883-6894
2004 Ford F150, factory alloy wheels, BF Goodrich P265/60R18 tires, 3K miles, \$600. 684-0439
1995 Toyota Avalon XLS, 187K miles, moon roof, AC/PW/AT, \$3,500. 256-830-4846
1991 Toyota Camry DX, \$1,750. 256-828-2864

2001 Suzuki SV650s motorcycle, blue, 6K miles, 2 helmets, \$4,099. 256-503-7327
2000 Isuzu Trooper Limited, 4WD, sunroof, CD changer, heated leather seats, \$7,250. 890-0799
1999 Bayliner 2050LS, 4.6L Mercruiser, galvanized trailer, \$9,500. 256-714-3769
2004 Altima, 5 speed, CD, silver w/gray cloth, 45K miles, \$13,000. 256-426-5764
1995 Mazda, MPV van, 6 cylinder, 150K miles, \$2,100. 256-797-4107
2004 VW GTI, black w/gray interior, heated seats, 50K miles, Eibach springs, \$14,000. 256-457-5173
1998 Dodge Grand Caravan, 150K miles, quad-seats, rear air, one owner, never wrecked, \$4,500. 603-1273
2004 Mustang GT Convertible, red with tan interior and top, 468-5061.
2004 Taurus SEL, ash gold, 47k miles, 6CD, cassette, spoiler, leather \$8,100. 256-828-4017
2002 Mercury Sable Sedan, White, 54K miles, DVD, cruise, extended warranty, \$7900. 461-9978
1985 Chevy Silverado, SWB, white, 350 engine, power windows/locks, CD, air, \$2,200. 517-8464
1996 Cadillac DeVille, green, loaded, \$3,200; 1995 Deville Concours, loaded, black, rims, \$2,400. 520-2802

Wanted

Child's tag-along bike for 3-4 year old rider. 651-4603
Full blooded Collie puppy, registered, 6-10 weeks old, female preferred. 931-438-1730

Found

Thermos in Bldg. 4203, Conference Room 4002, Jan. 19.
Call Troy Mitchell, 544-4680, to identify/claim

Free

Heathkit GR2000 color TV w/cabinet, for parts only. 883-8664

Memorandum of Understanding agreement supports Michoud

Marshall Center Director David King, seated at left, and Louisiana Gov. Kathleen Blanco shake hands following the signing of a Memorandum of Understanding at the Capitol Building in Baton Rouge recently.

The agreement provides the framework for the state's investment in new facilities and tooling capabilities at NASA's Michoud Assembly Facility in New Orleans. It also includes the state's commitment to advance research and technologies to support NASA's Constellation Program and Louisiana's National Center for Advanced Manufacturing at Michoud.

The Constellation Program is responsible for development of NASA's next-generation crew and launch vehicles and related systems for the



NASA/LED

agency's exploration mission to return to the moon and travel to Mars and beyond.

Also attending the signing were, standing from left, Don Person, assistant secretary of the Louisiana Economic Development Department; Mike Thompson, chairman of the Louisiana Commerce and Industry Board; Gil Pinac, commerce committee chairman of the Louisiana House of Representatives; Sheila Cloud, NASA's Michoud transition director; and Patrick Scheuermann, NASA's Michoud chief operating officer.

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